

Final Study Guide AE Chem (**He who suffers, remembers**)

Formulas of Compounds:

***Ionic Compounds***

*Use your ion sheet and the criss-cross method to give the formulas of the following ionic compounds.*

Potassium iodide

Barium chloride

Lead(II) nitrate

Copper(II) carbonate

Magnesium phosphate

Iron (II) sulfide

Sodium acetate

Ammonium hydroxide

*Name the following ionic compounds*

KClO<sub>2</sub>

Na<sub>2</sub>SO<sub>4</sub>

Li<sub>2</sub>CO<sub>3</sub>

CuCl

Pb(OH)<sub>2</sub>

Al<sub>2</sub>O<sub>3</sub>

FeF<sub>2</sub>

Mg(NO<sub>3</sub>)<sub>2</sub>

***Covalent Compounds***

*Write the formulas for the following covalent compounds.*

Nitrogen dioxide

Sulfur trioxide

Diphosphorous trioxide

Silicon hexachloride

Carbon disulfide

trinitrogen pentafluoride

*Write the name for the following covalent compounds*

N<sub>3</sub>Cl<sub>5</sub>

PO<sub>3</sub>

CCl<sub>4</sub>

N<sub>5</sub>O<sub>10</sub>

***Acids***

*Write the formulas for the following acids*

Hydrobromic acid

Sulfurous acid

Nitric acid

Acetic Acid

Hydrochloric acid

Nitrous acid

*Write the name of the following acids*

HF

H<sub>2</sub>SO<sub>4</sub>

HClO

H<sub>2</sub>CO<sub>3</sub>

H<sub>2</sub>S



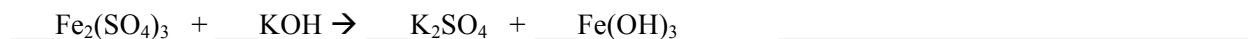
### ***Percent Composition***

Calculate the percent of **Hydrogen** in  $\text{H}_2\text{SO}_4$ .

Calculate the percentage of water in  $\text{BaCl}_2 \cdot 9\text{H}_2\text{O}$ .

How many grams of copper can be extracted from 25.0 g of,  $\text{CuCl}_2$ ?

Balance the following equations and indicate their reaction type.



What is Avogadro's number and what does it mean?

Convert the following amounts. Show all work with units.

5.0 mol Na =       ? atoms Na

6.2 mol  $\text{CuCl}_2$  =       ? formula units  $\text{CuCl}_2$

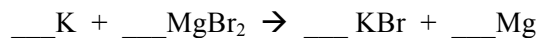
$1.2 \times 10^{24}$  molecules  $\text{CO}_2$  =       ? mol  $\text{CO}_2$

Convert the following amounts. Show all work with units. You may use a periodic table.

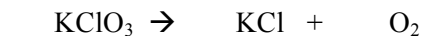
$$6.2 \text{ mol CuCl}_2 = \underline{\hspace{1cm}}? \underline{\hspace{1cm}} \text{ g CuCl}_2$$

$$1.2 \text{ g CO}_2 = \underline{\hspace{1cm}}? \underline{\hspace{1cm}} \text{ mol CO}_2$$

Use the reaction below to answer the following questions.



If 2.0 mol of K are used, how many mol of Mg are produced?



When 26.0 g of KCl are produced, how many moles of oxygen are also yielded?

When 1.20 moles of KClO<sub>3</sub> decompose how many grams of KCl are made?

When 16.0 g of oxygen are produced, how many grams of KCl are also yielded?

What four variables are we studying when we talk about gases?

What is an ideal gas?

What are the 5 points of the kinetic molecular theory?

List and describe the 5 major properties of gases.

Convert the following pressures. Show all your work with units.

600 mm Hg=   ?   atm

1.20 atm=   ?   kPa

If a gas with a temperature of 300K and a volume 1.2 L has its volume decreased to 0.95L, what is the new temperature of the gas?

If a 500 mL sample of oxygen has a temperature of 20.0°C, and temperature is changed to 15°C, what is the new volume of the gas?

If a 500 mL sample of oxygen has a pressure of 1.5 atm, and pressure changed to 0.50 atm, what is the new volume of the gas?

If 10 mL of methane gas has a pressure of 159 kPa, what is the new volume when the pressure changes to standard pressure?

What is the molar volume of a gas at STP?

How much volume does 12.2 mol of O<sub>2</sub> occupy at STP?

How many moles of neon occupy 12 L 50°C and 0.884 atm?

What is the pressure that 13.0 g of  $\text{CH}_4$  gas exerts at a volume of 13.4 L at 732 mm Hg and  $30^\circ\text{C}$ ?

Define the following terms.

Mixture-

Solution-

Solubility-

Solvent-

Solute-

Saturated-

Unsaturated-

Supersaturated-

Use the solubility curve on page 46 (or the handout I gave you) to answer the following questions:

What is the solubility of potassium nitrate in 100 grams of water at  $80^\circ\text{C}$ ? \_\_\_\_\_

What is the solubility of sodium chloride in 100 grams of water at  $90^\circ\text{C}$ ? \_\_\_\_\_

What is the minimum temperature needed to dissolve 35 grams of potassium chloride in 100 grams of water? \_\_\_\_\_

If 250 grams of potassium nitrate are mixed with 100 grams of water at  $85^\circ\text{C}$ , how much will *not* dissolve? \_\_\_\_\_

How much potassium nitrate will dissolve in *50 grams of water* at  $95^\circ\text{C}$ ? \_\_\_\_\_

An amount of 100 grams of water at  $90^\circ\text{C}$  are saturated with potassium chloride. If this solution is cooled to  $35^\circ\text{C}$ , how much of the solid will precipitate? \_\_\_\_\_

How much water is needed to dissolve 15 g of  $\text{KNO}_3$  at  $40^\circ\text{C}$ ?

How does solubility differ between gases and solids according to temperature?

How does pressure on a gas affect solubility of that gas? Give an example.

What is the molarity of 200. g of calcium nitrate dissolved in water to make 4.10 L of solution?

A lab requires 500. mL of 2.10 M sodium hydroxide. What mass of sodium hydroxide should be massed out to make this solution?

What happens to the freezing and boiling points of a solvent when solute is added?

Describe what a phase diagram looks like. What does it tell you about a substance.

What are the characteristics of an acid? Name some common acids.

What are the characteristics of bases? Name some common bases.

What does pH measure? What is the pH of a 0.010 M HCl Solution?

What are neutral compounds?

What happens when an acid reacts with a base?

If 23.0 mL of 0.20M HCl is titrated with 46.0 mL of NaOH solution. What is the concentration of the NaOH?